



ACCEPTANCE TESTING

October 2007

Quick Start
MANAGEMENT GUIDE





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The Quick Start Management Guide for Acceptance Testing is part of a series of brochures designed to highlight and summarize the information contained in the chapters of the U.S. Election Assistance Commission's (EAC) Election Management Guidelines (EMG). The goal of the EMG is to provide a collection of election management guidelines, consolidated into one document, to assist State and local election officials effectively manage and administer elections. These guidelines are solely designed to serve as a source of information for election officials and not as requirements by which they must abide. The EAC expects the EMG to be completed in 2008. However, due to the urgent need for election management resources, EMG chapters and Quick Starts are being released as they are completed.

The content of the EMG and the Quick Start Management Guides has been developed in collaboration with State and local election officials and other election professionals who have first-hand experience managing elections. The EAC is grateful for their participation and ensuring the guidelines are practical and applicable for jurisdictions regardless of their size and resources. The EMG and the Quick Starts are available online at www.eac.gov.



INTRODUCTION

- Acceptance testing is one of the most important functions that local election jurisdictions perform. Acceptance tests provide assurance that newly acquired devices, as well as devices that had left your control and were returned, are functioning properly and are correctly configured for use in an election.
- An acceptance test is a test that is performed on an individual device (*i.e. a server, ballot scanner, or voting station*) in a voting system to assure that the device is physically, mechanically, electronically, and functionally correct. Correct, in this sense, means that the device and its associated software/firmware are identical in every respect to the device that was originally certified and purchased.
- Acceptance testing is usually associated with the process of verifying that newly purchased devices conform to the purchase agreements and are identical to the NASED or EAC certified device. However, an acceptance test should also be performed any time a device leaves your control and is returned. *Example: If a device is sent out for repair and returned or if a device is loaned to a group or organization for demonstration purposes and returned, you should complete an acceptance test upon its return to your possession.*
- Acceptance tests are conducted on individual devices such as touch screen voting stations, ballot scanners, etc. These devices must be a component of an overall certified voting system. A description of the devices that are part of your certified voting



system can be found on either the NASED Web site (<http://www.nased.org>) or the EAC Web site (<http://www.eac.gov>). These descriptions list not only the devices that make up the certified voting system, but also the specific software/firmware versions that support the certified system. You must have this information before beginning to conduct acceptance tests.

ACCEPTANCE TESTS

- Acceptance tests must be conducted either by or under the strict control of the jurisdiction's election official. Under no circumstance should acceptance tests be conducted by a vendor.
- It is recommended that your office maintain a complete record of every acceptance test that is conducted. *Example: Prepare a checklist that has a location for recording the date of the test, the type of device being tested (i.e. ballot scanner, touch-screen voting station, etc.), the serial number of the device, the outcome of the test (i.e. passed, failed), the name of the person conducting the test, and a space for comments. When the test is completed, staple all printed test outputs to this sheet.*
- The procedures for conducting acceptance tests may seem complicated and burdensome at first. However, you will find it easier and become more efficient at it the more you conduct these tests and familiarize yourself with the process. On average, an experienced tester takes approximately fifteen minutes (or less) to conduct an acceptance test on a typical device such as a touch-screen voting station.

- There are three distinct parts to an acceptance test: *a test for physical damage, a diagnostic test, and a test for functional correctness.*
 - **PHYSICAL ANALYSIS:** This test is to assure that the device is not physically damaged. This test includes:
 - Inspection of the outer shell or case that contains the device.
 - Inspection of the latches and hinges on the outer shell or case.
 - Inspection of all doors and locks.
 - **DIAGNOSTIC ANALYSIS:** This test is to assure that all of the mechanical and electronic components of the device are operating correctly. This test includes:
 - Tests of all input/output devices, such as card readers and printers.
 - Tests of ballot feed paths.
 - Tests of touch-screen calibration and intensity.
 - Tests of time, date selection.
 - Tests of connections for external devices, such as earphones and handicap navigation devices.
 - **FUNCTIONAL ANALYSIS:** This test is to assure that the correct versions of the software/firmware are installed in the device and that the device will perform correctly during an election. This test consists of loading a mock election onto the device, casting a known pattern of votes, and then counting the votes and comparing the results with the known pattern.



GENERAL OUTLINE FOR CONDUCTING AN ACCEPTANCE TEST

- The following three sections provide a generic outline for conducting acceptance tests of the most common devices found in an electronic voting system: ballot scanners, touch screen voting stations, and election management systems. The EAC has compiled specific Acceptance Test Scripts for many of the currently used electronic voting system devices. To find out if scripts are available for your voting system, contact the EAC's Director of Voting System Testing & Certification at 1-866-747-1471 (toll free) or via e-mail at HAVAinfo@eac.gov.

OPTICAL SCAN BALLOT SCANNER ACCEPTANCE TEST

- **MATERIALS REQUIRED.** In addition to the following, you must know the correct version of the operating system and/or firmware that was certified for your ballot scanner:
 1. A memory card or other device with the election setup for your acceptance test.
 2. Password, manager card, or other device for gaining manager/administrator privilege on the voting station.
 3. A test set of pre-marked optical scan ballots.

- **PHYSICAL ANALYSIS.** Conduct the following with the ballot scanner turned **OFF**:
 1. Examine the case and/or cover for cracks or dents.
 2. Inspect latches, hinges, and wheels, if present.
 3. Examine the legs and/or stand, if present.
 4. Inspect the power cord and plug.
 5. Verify that there is paper in the printer.

- **DIAGNOSTIC ANALYSIS.** Conduct the following with the ballot scanner turned **ON**. Some of these tests may require manager/administrator privilege.
 1. Turn the ballot scanner on, and as it boots up verify that the correct versions of the operating system and firmware are installed.
 2. Verify that the date and time are correct.
 3. Print a test output to verify that the printer is operating correctly.
 4. Unplug the ballot scanner and verify that it will operate on battery power alone.
 5. Verify that the battery charger will charge the battery.
 6. Test all I/O ports and card slots (*i.e. serial ports, voter card slots, etc.*).



- **FUNCTIONAL ANALYSIS.** Conduct the following with the ballot scanner turned **ON ELECTION (TEST) MODE**. Install the election setup for the test ballot, then:
 1. Zero totals.
 2. Print zero tape.
 3. Use the pre-marked test set of ballots to accumulate a significant number of ballots (*at least 25*) on the ballot scanner.
 4. Close the election on the ballot scanner.
 5. Print the results.
 6. Verify the vote counts are correct.
 7. Zero totals.

RECOMMENDATION: WHEN A BALLOT SCANNER SUCCESSFULLY PASSES YOUR ACCEPTANCE TEST, AFFIX TO THE BACK OR UNDERSIDE OF THE BALLOT SCANNER A LABEL WITH THE DATE OF THE TEST AND THE INITIALS OF THE PERSON THAT CONDUCTED THE TEST.

TOUCH SCREEN (TS) VOTING STATION ACCEPTANCE TEST

- **MATERIALS REQUIRED.** In addition to the following, you must know the correct version of operating system and/or firmware in your TS:
 1. A memory card or other device with the ballot for your acceptance test.
 2. A serial loop back connector, if the voting station is equipped with a serial port.
 3. Voter cards or other device for activating the voting station for a voter.
 4. Manager card or other device for gaining manager/administrator privilege on the voting station.
- **PHYSICAL ANALYSIS.** Conduct the following with the unit turned **OFF**:
 1. Examine the case and/or cover for cracks or dents.
 2. Inspect latches, hinges and wheels, if present.
 3. Examine the legs and/or stand.
 4. Inspect the power cord and plug.
 5. Verify that there is paper in the printer.



- **DIAGNOSTIC ANALYSIS.** Conduct the following with the unit turned **ON**. Some of these tests may require manager/administrator privilege.
 1. Turn the voting station on, and as it boots up verify that the correct operating system and firmware are installed.
 2. Verify that the date and time are accurate and correct if necessary.
 3. Verify the screen calibration and calibrate if necessary.
 4. Print a test output to verify that the printer is operating correctly.
 5. Examine the screen for condition and clarity.
 6. Unplug the unit and verify that it will operate on battery power alone.
 7. Verify that the battery charger will charge the battery.
 8. Test all I/O ports and card slots (*i.e. serial ports, voter card slots, etc.*).

- **FUNCTIONAL ANALYSIS.** Conduct the following with the unit turned **ON ELECTION (TEST) MODE**. Insert precinct election media for the test ballot, then:
 1. Verify that the ballot loaded correctly and contains all contests and candidates.
 2. Zero totals.
 3. Print zero tape.
 4. Manually enter one vote for each candidate or issue.
 5. Verify that each candidate and issue has received exactly one vote.

6. If the TS voting station has a provision for automatic Logic & Accuracy (L&A), use this feature to enter a total of ballots that exceeds the number of ballots expected on the voting station in a typical election (*usually about 150*).
7. Close the election on the voting station.
8. Print the results.
9. Verify the vote counts are correct.
10. Zero totals.

RECOMMENDATION: WHEN A VOTING STATION SUCCESSFULLY PASSES YOUR ACCEPTANCE TEST, AFFIX TO THE BACK OF THE VOTING STATION A LABEL WITH THE DATE OF THE TEST AND THE INITIALS OF THE PERSON CONDUCTING THE TEST.





ELECTION MANAGEMENT SYSTEM ACCEPTANCE TEST

- This Acceptance Test is designed to verify that the Election Management System (EMS) is correctly configured and operating properly. Acceptance tests should always be conducted on a new EMS prior to its use in an election. Also, acceptance tests should be conducted on an EMS that was returned after having left your control. *Example: If the EMS computer is sent out for repair or if a new version of the operating system or the EMS is installed, an acceptance test should be conducted on the EMS as soon as it is returned.*
- **MATERIALS REQUIRED.** In addition to the following, you must know the correct version of your operating system and your EMS. The following components of a voting system are required to complete the acceptance testing procedures:
 1. One Computer with EMS installed.
 2. If Touch Screen (TS) Voting Stations are used:
 - One TS Voting Station,
 - One Blank TS Memory card/device,
 - One TS Manager/Supervisor card/device, and
 - One TS Voter card/device.
 3. If Optical Scan (OS) Ballot Scanners are used:
 - One OS Ballot Scanner,
 - One Blank OS Memory card/device, and
 - One set of pre-marked OS test ballots with known vote totals.

4. All communications cables and devices necessary to connect the TS voting station and the OS ballot scanner to the EMS computer.
5. One blank storage device of the type used by your system to store the election setup.
6. One storage device containing your acceptance test election setup.

IMPORTANT PREREQUISITES. The EMS computer system, consisting of items 1 through 4 above should have been setup and tested before beginning this test.

(NOTE: *It is OK to let your IT staff do this part of the setup because in the course of conducting the following acceptance test you are going to verify that everything has been setup correctly.*)

The TS voting stations and the OS Ballot Scanner should have previously completed acceptance testing. If not, run the TS Voting Station and the OS Ballot Scanner Acceptance Test on these units before beginning this test.

- **VERIFY CORRECT OPERATING SYSTEM AND EMS SOFTWARE.** Turn on the EMS computer. As the computer boots up, verify that the correct versions of the operating system and the EMS software are installed. Compute the hash codes for the EMS voting system software and compare them with the values contained on the National Secure Reference Library's (NSRL) Web site at (<http://www.nsrl.nist.gov/votedata.html>). The NSRL is a secure repository for software offered by the National Institute of Standards and Technology (NIST).



- **VERIFY EMS HARDWARE.** Verify that all hardware components of the EMS computer are turned on and functioning properly. *This includes checks of the printer(s), communication devices, disk drives, etc.*

- **VERIFY EMS FUNCTIONALITY.**
 1. Load the EMS acceptance test database on the EMS computer.
 2. Verify that the EMS will support the TS voting station *(if your system does not support TS voting stations go to step 3):*
 - Use the EMS to prepare the memory card or other device used to load the election definition into the TS voting station.
 - Load the election definition into the TS voting station.
 - Open the election on the TS voting station.
 - Cast votes on the TS voting station. Cast one vote for each candidate or issue on the ballot. If the TS voting station has automatic L & A capability, use this feature to cast additional votes on the TS voting station.
 - Close the election on the TS voting station.
 - Print the vote totals on the TS voting station.
 - Use the standard method of transferring votes from the TS voting station to the EMS system to load the votes from the TS voting station to the EMS system.

3. Verify that the EMS will support the OS Ballot Scanner:
 - Use the EMS to prepare the memory card or other device that is used to load the election definition into the OS ballot scanner.
 - Load the election definition into the OS ballot scanner.
 - Open the election on the OS ballot scanner.
 - Use the pre-marked set of optical scan ballots to cast votes on the OS ballot scanner.
 - Close the election on the OS ballot scanner.
 - Print the vote totals on the OS ballot scanner.
 - Use the standard method of transferring votes from the OS ballot scanner to the EMS system to load the votes from the OS ballot scanner to the EMS system.
4. Verify Printed Outputs:
 - Close the election on the EMS.
 - Print all election reports from the EMS.
 - Compare results from the EMS with results from the OS ballot scanner and/or the TS voting station.

RECOMMENDATION: WHEN YOUR ELECTION MANAGEMENT SYSTEM SUCCESSFULLY PASSES THE ACCEPTANCE TEST, AFFIX TO THE TOP OF THE COMPUTER CASE A LABEL WITH THE DATE OF THE TEST AND THE INITIALS OF THE PERSON CONDUCTING THE TEST.



FOR INFORMATION REGARDING THIS PUBLICATION OR
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THE EAC IS AN INDEPENDENT BIPARTISAN COMMISSION CREATED BY THE HELP AMERICA VOTE ACT OF 2002 (HAVA). IT IS CHARGED WITH ADMINISTERING PAYMENTS TO STATES AND DEVELOPING GUIDANCE TO MEET HAVA REQUIREMENTS, IMPLEMENTING ELECTION ADMINISTRATION IMPROVEMENTS, ADOPTING VOLUNTARY VOTING SYSTEM GUIDELINES, ACCREDITING VOTING SYSTEM TEST LABORATORIES AND CERTIFYING VOTING EQUIPMENT AND SERVING AS A NATIONAL CLEARINGHOUSE AND RESOURCE OF INFORMATION REGARDING ELECTION ADMINISTRATION.